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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 16, 1945

ECHNOLOGY DEPT:

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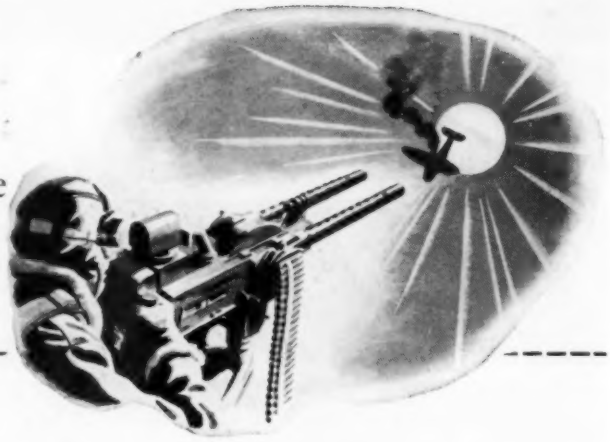
JUN 20 1945
DETROIT

Gibraltar on a Rock
See Page 378

A SCIENCE SERVICE PUBLICATION

In a bomber a GUNNER uses a new gun-sight lamp that permits him to aim *directly into the sun* – blasting enemy planes that otherwise would be invulnerable because of the blinding glare.

. . . the name on the GUNSIGHT LAMP is Westinghouse.

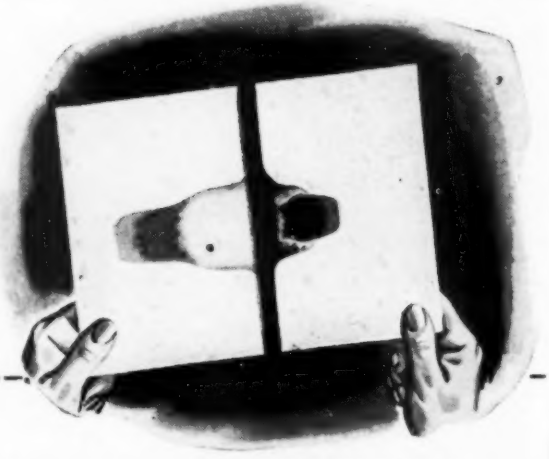


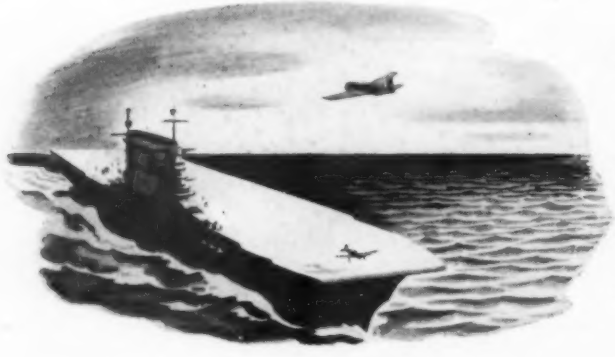
On a railroad an ENGINEER gets smoother operation – and 25% more power – from his steam locomotive because of a revolutionary new steam turbine drive.

. . . the name on the TURBINE DRIVE is Westinghouse.

In an Army arsenal a BALLISTICS EXPERT photographs projectiles, smashing through armor plate, with an x-ray tube that takes a picture in *1/1,000,000th of a second.*

. . . the name on the X-RAY TUBE is Westinghouse.





On a carrier a PLANE DIRECTOR uses a new kind of elevator to hoist planes on deck faster – keeping the deck cleared and getting fighters into the air quicker.

. . . the name on the ELEVATOR is Westinghouse.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

Tune in: JOHN CHARLES THOMAS—Sun. 2:30 pm, EWT, NBC

TODAY – Westinghouse skill in research and engineering is constantly at work, developing new and better war materials for final Victory.

TOMORROW – This same research and engineering skill will mean more dependable, more efficient industrial equipment and appliances for the home.

PALEONTOLOGY

Fossil Deposit Found

Ice Age elephant bones, the tooth of a prehistoric horse and insect, tree, shrub and flower remains have been discovered near San Francisco Bay.

➤ BONES of an Ice Age elephant, the tooth of a prehistoric horse, insect remains and a wide variety of tree, shrub and wildflower fossils, found near San Francisco Bay, will help scientists picture prehistoric life in that region.

The fossil deposit was discovered when grading machinery, leveling off a hill that protruded into the edge of a former salt marsh, cut through the stump of a tree—and an elephant's tusk. The area was immediately investigated and the rich assortment of specimens is being studied at San Mateo Junior College, Frank M. Stanger states in *Science* (June 1).

Ten elephant tusks, ranging from four to ten feet in length, were found, as well as bones and teeth, but none of the skeletons were complete.

Tusks that appeared to be sound shattered into small bits at the first attempt to move them, and the bones were usually more fragile than the rock in which they were embedded. Portions of the bones were partially mineralized, while other parts, sometimes of the same bone, had completely disappeared. It was only with great care and the use of plaster casts, Mr. Stanger reports, that any of the tusks or bones were preserved.

Twenty-one more or less complete teeth were discovered, five of which were still in place in the jawbones. The jawbones of two animals are nearly complete, and one other pair was complete, but grotesquely distorted and badly decayed.

The tooth of the prehistoric horse was found in gravel at the edge of a stream bed. It was within a few feet of some of the elephant bones, but not in the same sedimentary deposit.

The green scarab-like iridescence of a beetle's wing was the first evidence of prehistoric insects to be discovered. Beetles, ants and grasshoppers have been identified by F. D. Klyver, paleobotanist at San Mateo Junior College. Numerous specimens of what appear to be insect and spider eggs were also found, either close beside the elephant bones or in the surrounding region.

Douglas fir, Monterey pine, Monterey cypress and alder head the list of identified trees. Snowberry and poison oak are among the shrub species, and a wild blackberry vine was found, as well as several common Western wild flowers, such as red maids and miner's lettuce. Ranging from small seeds and fine particles of wood to stumps and sizable logs, 68 different varieties of plants have been identified thus far.

Geologists who have studied the fossils generally agree that they belong to the middle or late Pleistocene time. The deposit was discovered only 20 feet above sea level in the unincorporated village of Millbrae, south of San Francisco, on the peninsula that separates the bay from the ocean.

While the alluvial fan was being formed by the streams, Prof. Eliot Blackwelder of Stanford University reasons, much of its surface was probably covered with vegetation on which elephants might feed. During rainy seasons this bed of sand-clay was possibly soft enough to cause animals as heavy as elephants to sink in it and not be able to escape.

After they had been entrapped and died, their carcasses would have been eaten by carnivores and their bones exposed, scattered and trampled, probably for some time, before being covered by the expanding alluvial deposits.

Once covered, the fineness of the mudflow around them, together with the never-failing supply of ground water at this low level, would have tended to keep them from decaying completely. Slumps or crawling of the soil, or possibly earthquakes, may have subsequently distorted the bones.

Animals of the Ice Age, such as the ground sloth, mastodon and bison, have already been identified near San Francisco by scattered skeletal remains, but mostly through the discovery of isolated fragments of one animal.

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AERONAUTICS

Controllable-Wing Plane Makes Handling Easier

➤ SMALL airplanes may be easier to fly as the result of the development of a new controllable-wing plane now undergoing exhaustive tests at Stout Research Division in Dearborn, Mich. This experimental plane is built so that the position of the wings in relation to the fuselage may be changed at will by the pilot.

Advantage of the controllable wing

CONTROLLABLE WINGS—Greater safety and easier handling of personal aircraft may result from this new development. The controllable wing eliminates the necessity of ailerons, elevators and rudders.

appears to be that it will result in greater safety and easier handling of personal aircraft. The controllable wing eliminates the necessity for ailerons, elevators and rudders.

Several years may be required to develop the wing before it can replace the conventional type, reports I. M. Laddon, vice president in charge of engineering of Consolidated Vultee Aircraft Corporation, parent company of the Stout laboratories.

The controllable-wing plane was developed by George Spratt, who piled up 100 hours of secret flying with his new plane before friends knew he could fly. He cannot fly a conventional-type airplane.

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DENTISTRY

Hard on Teeth

Drinking large quantities of popular cola drink destroys the enamel, studies with rats show. The effect on humans has not yet been determined.

➤ DRINKING large quantities of a popular cola beverage is hard on the teeth of rats, causing severe destruction of the enamel, Lieut. Comdr. J. S. Restarski, Lieut. R. A. Gortner, Jr., and Lieut. Comdr. C. M. McCay found in studies at the Naval Medical Research Institute in Bethesda, Md. (*Journal, American Dental Association,* June.)

Since men are not mice or rats, the Navy officers are not yet issuing any warning against human consumption of cola drinks. Differences in composition of the saliva, manner of drinking and amounts of beverage consumed must be studied before the results of the rat studies can be applied to humans.

The cola beverage tested is not the only soft drink that can be hard on tooth enamel. Probably any other acid-containing soft drink would cause the same destruction, especially when sweetened. For reasons of economy, the Navy officers made part of their studies with a drink containing the same amounts of sugar and phosphoric acid as the cola beverage contains. The effect on the rat's tooth enamel was the same.

Ginger ale, grapefruit juice and cranberry juice as well as the cola drink had been found, by another scientist, to have an enamel-destroying effect.

Although the acid alone caused some enamel destruction, sugar added to the acid drink aggravated the effect.

In one part of the study the scientists added sodium fluoride to the acid beverage. Sodium fluoride in very minute amounts in drinking water seems to protect teeth from decay when taken during the years of tooth formation. It decreased but did not entirely prevent the destruction of the enamel caused by the acid or cola beverage.

The only clue so far reported to the effect of these acid-containing drinks on human teeth came from a study with teeth that had had to be pulled from various patients. When these were immersed in a cola beverage for two days, the enamel surface had lost much of the calcium that gives it its hardness.

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CHEMISTRY-ENGINEERING

Plastic Replicas Used To Test Smoothness

➤ THE SMOOTHNESS, or degree of finish, of metal parts can now be rapidly and satisfactorily determined by the use of nearly transparent plastic replicas, following methods developed by the National Bureau of Standards, and acceptable modes of specifying and designating surface finish will probably result. Metal smoothness specifications have been lacking in the past because no easy method of evaluating them had been worked out.

The new method, described by Harry K. Herschman of the Bureau staff in Mechanical Engineering, consists of applying a suitable solvent to the metal surface, then pressing on a strip of clear plastic film. The solvent softens the side of the film adjacent to the surface being examined and permits it to flow and conform under the pressure to the minute surface irregularities. The film dries in about a minute and can then be stripped off readily, giving a perfect facsimile of the surface.

After a replica is made, its degree of transparency depends upon its roughness; increased roughness results in decreased transparency. Also, the rougher the metal surface, the more pronounced are the variations in the regularity of the reproduced pattern. This fact led to the development of the apparatus for evaluating surface roughness, based upon the degree of variation of the geometric characteristics in a nearly transparent replica. In this apparatus a restricted beam of light passes through an oscillating test replica and to a photoelectric cell. The intensity of the light transmitted through the oscillating replica varies because of the unevenness of the surface of the pattern. Voltage readings of the current from the photoelectric cell may be calibrated in terms of the "peak-to-valley" values of the surface.

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BIOPHYSICS

Cast of Virus Studied

Evaporated gold is deposited on particles of tobacco mosaic disease virus in film only eight Angstroms thick for study under electron microscope.

➤ GOLD films of ultramicroscopic thinness, "cast" over solidified protein particles that are the essence of a virus disease of plants, are helping scientists using the electron microscope to get a better idea of the size and shape of these particles, forever beyond the direct reach of the human eye even when looking through the most powerful of lens combinations.

The new method was worked out in laboratories at the University of Michigan by two physicists, Dr. Robley C. Williams and Dr. Ralph W. G. Wyckoff, who describe it in some detail in *Science*, (June 8).

Objects less than one light wavelength in diameter cannot be made visible in the ordinary-type microscope because they are unable to stop or turn aside light waves. But they can still be photographed when streams of magnetically focussed electrons are substituted for beams of light.

However, the streams of electrons are very apt to destroy the organic particles, or at least radically change them, before suitable photographs can be made. It is therefore often advantageous to study, not the objects themselves but "casts" formed by depositing some more durable material over them, very much as you can examine last December's snowflakes in June if you caught them on drops of plastic as they fell and kept the molds thus formed.

To get their ultramicroscopic "castings" of tobacco mosaic disease virus particles, Drs. Williams and Wyckoff place a drop of a watery suspension known to contain the virus on a chemically clean glass slide. After the water has evaporated, nothing can be seen on the slide; nevertheless the invisibly tiny bits of solidified virus protein are still there.

They next place their slide in a vacuum chamber, in which a small bit of gold is electrically heated until it goes past its melting-point and becomes a vapor. Some of this evaporated gold falls on the glass and solidifies into a very thin film, just as a sheet of ice would form if water vapor were introduced and the chamber temperature held below freezing-point. Where the gold falls on the virus protein particles, minute hollows are formed, with every detail of the particle structure faithfully reproduced in negative.

The gold film is only about eight Angstrom units thick. An Angstrom unit is the light-measurer's "inch"; how short it is can be realized from the fact that light at the limit of high-violet visibility has a wavelength of about 4000 Angstroms. A gold film only eight Angstroms thick, therefore, cannot be seen at all, and so cannot be directly picked up.

To get around this difficulty, the two physicists coat the slide with collodion, to which the thin gold will firmly adhere. This collodion film they strip off and place on the stage of the electron microscope. By such roundabout methods they are finally able to get a likeness of the invisible virus particles, faithful in its details as a sculptor's life-mask, into position where the searching beams of the electron microscope can make shadow photographs.

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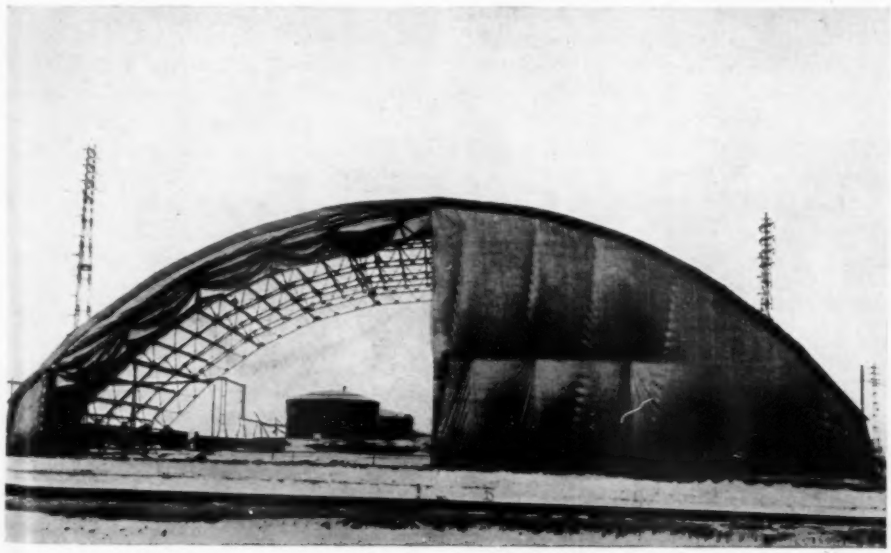

GLASS CLOTH HANGAR—Glass cloth, woven of glass fiber yarns and coated with either synthetic rubber or resin, is being used for curtains, side walls and ends in newly developed airplane hangars. Use of coated glass fabric for sections of hangars saves a great amount of shipping weight and speeds assembly of the hangars.

ASTRONOMY

Fire Lookouts to Help Make Eclipse Observations

➤ FIRE LOOKOUTS of the U. S. Forest Service will help astronomers by observing the July 9 eclipse. Accustomed to thinking fast and acting quickly when a fire is discovered, these foresters are ideal persons to carry out a rapid-fire series of observations.

About 60 foresters in lookout towers on mountain peaks in Montana and Idaho, some of the peaks 10,000 to 12,000 feet above sea level, will study the advancing shadow of the moon. For them the shadow will sweep down for a minute or less at about 6:14 a.m., Mountain War Time.

A questionnaire sent by Dr. John Q. Stewart of Princeton University Observatory suggests that three kinds of observations relating to the shadow would be helpful. Its motion in the sky can be reported in detail; the degrees of darkness on the ground estimated; and stars identified during totality, particularly the faintest stars.

The total eclipse is over so quickly (30 seconds) that no single inexperienced observer will have time to carry out more than one observation.

Although Dr. Stewart suggests that everyone spare a few seconds for a glance at the beautiful corona, he points out that observations of the corona by amateurs are not likely to be of scientific value, whereas adequate observations of the shadow are very desirable.

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METEOROLOGY

Meteorological Data Lost

Rev. Charles E. Deppermann, released from internment, tells of loss of publications and manuscripts representing years of work in Manila.

► A HITHERTO unreported tragedy of the war, that instead of destroying a man's life merely destroyed practically all of his lifetime of scientific work, was reported before the meeting of the American Geophysical Union in Washington, by one of the world's leading meteorologists, Rev. Charles E. Deppermann, S. J., assistant director of the Manila Observatory. Father Deppermann was recently rescued from the hands of the Japanese, who had held him in the internment camp at Los Banos.

During the first week after Pearl Harbor, and before the Japanese landing on the northern Luzon coast, a new book by Father Deppermann, of importance to navigators of air and sea, was published in Manila. There was just time to distribute a few copies to Navy officers and Pan-American Airways men before the siege of Manila closed in. Most of the copies were successfully hidden, and the invaders never found them, but the whole stock was destroyed by fire in the last days of the city, when MacArthur's men were storming in on the suicidal enemy. Even the copies that were distributed seem to have perished during the fighting on Bataan and Corregidor.

A number of other works on Philippine weather, still in manuscript, also vanished in the flames. Practically all of this research will have to be done over again, for the data and conclusions based on them will be needed by navigators in postwar times.

Father Deppermann gave from memory and what fragmentary notes he possessed some of the weather characteristics of the Philippines and adjacent parts of southeastern Asia, in particular the most dreaded of their storms, the typhoon.

The main region of typhoon wind energy, he has concluded, is at heights of from two to four kilometers (1¼ to 2½ miles). There is, however, evidence of violent wind in these storms as high as 10 kilometers (over six miles), but few observations at those altitudes have as yet been taken.

One factor in the development of the low barometric pressures noted in typhoons, Father Deppermann pointed out, is the condensation of water vapor into rain. As a gas, the water vapor contributes to the total atmospheric pressure; when it becomes liquid drops and falls, it is of course withdrawn from the picture and the barometric pressure must fall accordingly. Since rain falls torrentially during a hurricane, this factor may become one of considerable importance.

The region around the fortress-island of Truk serves as an especially prolific breeding-ground for typhoons, the speaker indicated.

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AERONAUTICS

Too Much Speed Is Bad

Traveling faster than sound means getting bumped around violently by air turbulence. Will set new problems in airplane design.

► JUST as people do not enjoy driving through brick walls, so they will not enjoy flying in airplanes at the speed of sound, declared John Stack, chief of the compressibility research division, Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics. When we approach the speed of sound in the air, the turbulence of the air buffets the plane violently, he stated in response to a question.

Flying at the speed of sound is like driving in a car at high speed over rutted cobblestone roads, he commented, and pointed out that aeronautical research workers are in the process of smoothing this road to achieve flight at supersonic speeds where smooth flows may exist. Mr. Stack spoke as the guest of Watson Davis, director of Science Service, on the CBS radio program, "Adventures in Science."

Explaining what happens to an airplane when it approaches the speed of sound in a wind tunnel, Mr. Stack declared that when an airplane is flying, air flows over and under the wing, around the fuselage and tail and around the tips of the wings. The flow in general is smooth. Mr. Davis commented that the effect is like a boat moving through water at moderate speeds and creating bow waves and stern waves.

"Air flows differently than usual when speeds approaching and exceeding the speed of sound are attained," Mr. Stack pointed out. "This is so because sound speed, 760 miles an hour at high altitudes, is really the speed at which a pressure disturbance sends out its influence. One can visualize sound speed as the speed at which the pressure disturbance set up by the body telegraphs to the air the news of the body coming. When the speed of the body is low compared to sound speed, the air ahead has ample advance notice that the body is coming and thus has time in which to prepare itself for the arrival of the body. When the speed of the body is great in relation to sound speed, the air has either too little or no advance notice of the impending arrival of the body and hence cannot properly prepare for smooth passage of the body. What are known as shock waves involving abnormal drag increase, then occur.

"The air which strikes the shock wave usually undergoes sharp change in direction and some energy is lost. The sharp change in direction coupled with the lost energy usually results in separation of the flow from the surface of the body. One might visualize this separation of flow as a breaking away of air in chunks."

Today, the top speed achieved in level flight by an airplane is less than 600 miles an hour, Mr. Stack pointed out. However, the gas turbine and jet propulsion may enable us to fly at supersonic speeds. These speeds offer new problems in aeronautical design, he stated.

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The *ginkgo*, a relic of a large plant family that had representatives over much of the world in long-past geological days, is, perhaps, the oldest type of tree; it is also known as the maiden-hair tree.

One thousand fifty pounds of *cork* were stripped from the largest cork oak in the country, at Napa, Calif.

AERONAUTICS

Postwar Jet Engines

Jet propulsion of civilian aircraft depends upon designers' ability to produce a plane of lower drag to offset the high fuel consumption.

➤ JET propulsion of commercial aircraft in future is dependent upon aircraft designers and their ability to produce a plane of lower drag to offset the high fuel consumption of the thermal jet engine, declared Dr. M. J. Zucrow of the Aerojet Engineering Corporation at a meeting of the Aviation War Conference of the American Society of Mechanical Engineers in Los Angeles. Dr. Zucrow discussed both thermal jet engines and rocket motors.

"At present, because of high fuel consumption, the application of the thermal jet engine appears to be restricted to short-endurance military craft," he said. "Until more of the operating data and actual performance characteristics of aircraft equipped with this form of power plant become available, the possibilities of applying thermal jet propulsion to civilian aircraft cannot be expressed with certainty."

The speaker recognized that jet propulsion provides greater flight speeds than the conventional engine-driven propeller systems.

"Perhaps the most attractive feature of the thermal jet engine, apart from its ability to provide propulsion at high speeds, is its simplicity and low weight," he continued. "Furthermore, this power plant is relatively free from vibration, permits using cheaper fuels than high-octane gasoline, and should require less frequent major overhauls."

Many problems are presented by the high operating temperatures required to obtain even fair fuel economy, he said, and there are still metallurgical problems to be solved. The fact that thermal jet propulsion has become a practical reality is an indication, he added, that great progress has already been made.

The principal application of rockets to aircraft in the United States, he explained is in the field of assisted take-off. Most of the applications of rocket motor units have been to flying boats, although such units have been successfully used with carrier- and land-based planes. Two types of units are employed, some using liquid and some solid propellants. The solid-propellant units have found the greatest favor, according to Dr. Zucrow.

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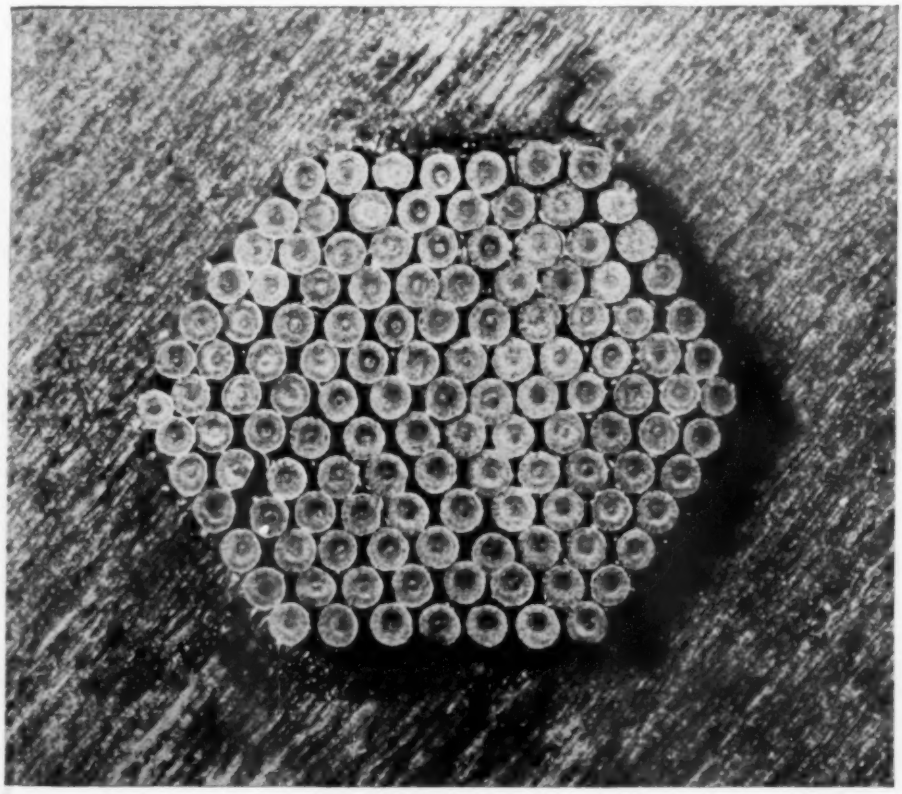

MATHEMATICAL INSTINCT—It is interesting to note that this cluster of eggs of the Wheel-bug has been arranged by the insect into a definite design with mathematical precision. Each egg is individually glued in place and covered with a water-proof substance. These clusters of eggs are usually found on the bark of trees. The Wheel-bug, like many other insects, seems to have the instinct of arranging its cluster of eggs into a hexagonal design. Photograph by George A. Smith of Quarryville, Pennsylvania.

CHEMISTRY

Many Postwar Uses for New Organic Cements

➤ HUNDREDS of postwar uses for a bonding cement, now playing an important role in war equipment, are suggested, from holding metal plates together without rivets or welds, to replacing needles and thread in the garment-making industry. It is a new synthetic cement developed in the laboratories of the Goodyear Tire and Rubber Company, and can be used to bond wood, plastics, rubber, fabrics, and metals together in any combination.

This cement, called Pliobond, forms a bond that is flexible, waterproof and possessed of high tensile strength. It retains these characteristics at temperatures ranging from 70 degrees below zero Fahrenheit to 140 degrees above. It is easily applied and adheres at once to any clean, dry surface.

A bonding agent with similar properties has been developed also by the B. F. Goodrich Company. It is a new rubber cement, called Plastilock, which is a nonthermoplastic, water and aromatic oil-resistant adhesive for bonding metals, wood, plastics and ceramic material to themselves or to each other. In use, better results follow when it is applied with heat and pressure. The purpose of the pressure is to obtain good surface contact. In an attempt to pull apart aluminum and wood held together with this material, the bond proved stronger than the wood itself.

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LOGISTICS

Blood Plasma Fired in Artillery Shells

➤ BLOOD plasma was successfully fired in artillery shells to Allied troops cut off by Nazis in Europe, reports Maj. Gen. Paul R. Hawley, surgeon to the European Theater of Operations. (*Marine Corps Gazette*, May). This adds a new item to the list of many ways in which blood plasma has been delivered to American fighting men. In the past, plasma has gone to the front by plane, ship, on horseback and in jeeps, and it has been dropped from the air in parachutes.

Gen. Hawley reports also that pre-invasion estimates of the amount of plasma that would be required to fill the needs of the Army were far too low. Instead of one transfusion required for every five men wounded, battle experience has shown the need for one transfusion for every two men wounded.

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DENTISTRY

Tooth Decay Experiment Has First Birthday

➤ THE FIRST birthday of a mass experiment to stop tooth decay in two New York cities was celebrated at a luncheon given by the New York Institute of Clinical Oral Pathologists.

Dentists toasted the future success of the experiment, results of which will not be known for another nine years, in drinks of fluorinated water brought in casks from Newburgh, N. Y. After basic examinations starting a year ago, Newburgh's drinking water supply is having sodium fluoride added to it in the minute amounts believed effective in stopping tooth decay.

Kingston, neighboring city of approximately the same size, will continue to have its water supply free of fluorine and thus serve as a control for the study.

All five- to 12-year-old children in the schools of both cities are having their teeth examined every year. Fluorine-containing water drunk regularly during the years of tooth development, that is, through the age of eight years, protects teeth from decay, it appears from surveys in communities where the natural water supply contains fluorine.

At the end of the 10-year experimental period, comparison of the teeth of the children in both cities should give definite evidence on this point. The effects of fluorinated water on the teeth of persons over 50 years will be determined by examinations on adults in the two communities.

The study is under the direction of Dr. David B. Ast, dental director of the New York State Department of Health.

"There is every reason to believe," he said, "that artificially fluorinated water will produce in humans the same results in kind and degree that are caused by waters in which fluorine is found naturally."

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ASTRONOMY

Copenhagen Is Again Astronomical News Center

➤ THE END of the European war has had a significant turn in the astronomical world, for word has been received from Denmark of the reestablishment of direct contact between the astronomical clearing house of the Eastern Hemisphere at Copenhagen and the Harvard clearing house for the Western Hemisphere.

Harvard College Observatory received the following wire from Prof. Elis Strömgren of the Copenhagen University Observatory:

"Please from now on send again astronomical mail and telegrams directly to Copenhagen."

During the European war communication with Copenhagen and the astronomers on the continent was carried on only by way of Sweden, thereby often resulting in serious delays in the transmission of information on suddenly appearing new stars and rapidly moving comets.

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ENTOMOLOGY

Department of Insects Opened at Bronx Zoo

➤ A NEW Department of Insects has been opened at the Bronx Zoo in New York, where the more interesting species of this important but small-sized order of animal life will be on public display. For the present, the "insectarium" will occupy part of the Zoo's reptile house, but as soon as postwar conditions permit, a special building will be put up to house the insect exhibits.

Brayton Eddy, former Administrator of Entomology and Plant Industry for Rhode Island, has been named Curator of Insects at the Zoo, and has also become Acting Curator of Reptiles. The late Dr. Raymond L. Ditmars was in charge of reptiles for more than forty years.

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IN SCIEN

BOTANY

Russian Botanists Plan To Exchange Specimens

➤ AMERICAN scientific museums and universities will soon have opportunity to get seeds and herbarium specimens of Russian plants, in exchange for American botanical material. Large-scale preparations for this scientific cooperation are being made at the Central Botanical Gardens in Leningrad, the Academy of Sciences of the USSR has cabled to Science Service.

Greenhouses and other buildings of the gardens, which suffered severely during the long siege of Leningrad, are being rebuilt, and more than 700 acres of new land has been added to the working area. About 10,000 trees, shrubs and flowers are already growing in the nurseries.

The Leningrad botanical institution traces its origin to a garden of medicinal plants set out in 1713 under the direction of Czar Peter the Great.

Science News Letter, June 16, 1945

CHEMISTRY

Peanuts Found Useful in Adhesives, Paper Sizings

➤ PEANUTS, long regarded lightly as of interest only to small boys and circus elephants, are steadily rising in the scale of industrial and agricultural respectability. U. S. Department of Agriculture scientists are finding new and more efficient uses for them, in addition to their already big-business role as producers of a high-grade vegetable oil.

The high-protein meal left after oil extraction has long been used as livestock feed; but now industry comes forward to compete with livestock for a share of it. Peanut protein has been found useful in adhesives, paper sizings and fabric coatings, by chemists at the Southern Regional Research Laboratory in New Orleans. The sugary liquor remaining after protein extraction can be used as a culture medium for a food yeast, thereby providing an additional source of protein for livestock feeding.

At the Northern Regional Research Laboratory in Peoria, Ill., chemists have developed a method for using ground-up peanut hulls instead of ground cork as a basis for crown cap liners for bottles.

Science News Letter, June 16, 1945

E FIELDS

VETERINARY MEDICINE

Fern Hay Poisonous to Horses, Studies Indicate

➤ HAY containing the dried leaves of the sensitive fern, a species widely distributed over the eastern half of the United States, is unwholesome for horses, studies at the University of New Hampshire have shown.

Horses are not all equally susceptible to the fern's poison. Old horses fed on hay alone were most frequently affected, while working horses that were fed grain along with the hay were not harmed. Chances of recovery, of course, were best when the trouble was detected in early stages.

Sensitive fern, so called because it is easily killed by frost, is an unattractive, coarse-leaved plant that grows abundantly in damp lowlands, and hence is very apt to be mixed in with hay mowed on wet meadows.

Science News Letter, June 16, 1945

CHEMISTRY

Willard Gibbs Medal Awarded Dean Whitmore

➤ THE WILLARD Gibbs Medal Award of the Chicago section of the American Chemical Society goes this year to Dr. Frank C. Whitmore, dean of the School of Chemistry and Physics of Pennsylvania State College. Dean Whitmore was selected as the 34th recipient of this prized medal by a jury of 12 prominent American chemists because of his outstanding contributions to organic chemistry, and his vigorous leadership in the advancement of chemistry for national benefit. The formal presentation will be in September.

Much of the work of Dr. Whitmore has been accomplished during the 15 years that he has occupied his present position. Prior to 1929, however, original investigations made by him in organic chemistry at Harvard, Williams, Rice Institute, University of Minnesota and Northwestern University had attracted much attention. He is the recipient of other medals and of several honorary degrees.

This annual award, regarded by many as the outstanding medal award in the chemical field, was founded in 1911 by William A. Converse, who named it for the late Willard Gibbs, renowned American physical chemist.

It is awarded to anyone who, because of his eminent work in, and original contributions to, pure and applied chemistry, is deemed worthy of special recognition. Among many notable former recipients are Ira Remsen, Mme. Curie, Irving Langmuir, Vladimir Ipatieff and Thomas Midgley.

Science News Letter, June 16, 1945

MILITARY SCIENCE

Fewer Unknown Soldiers In World War II

➤ WORLD WAR II will have fewer Unknown Soldiers than World War I, as a result of identification techniques now in use on every battlefront. Only a little over 2% of the dead soldiers in this war, in our 321 overseas cemeteries, are unknown, thanks to the thoroughness of the Graves Registration Service of the Quartermaster Corps.

This drastic reduction has been brought about through the use of identification bracelets and "dog tags" on all service personnel, and through the development of a small, compact portable fingerprinting kit. Weighing only five pounds, the kit measures 9.5 inches long, 7 inches wide, and 2.5 inches deep.

Normally, the "dog tags" or bracelet establish a man's identity without question. On every report of interment, the raised letters on the dog tags are impressed into the surface of the report form itself, for permanent reference.

However, should the tags or bracelet be missing, the fingerprints are taken and a chart of the upper and lower sets of teeth are made. When these are compared with the master records, the true identity of the serviceman is revealed.

Science News Letter, June 16, 1945

HOME ECONOMICS

Cold Water Canning Found Unsatisfactory

➤ COLD WATER canning, sometimes recommended for rhubarb, gooseberries and sour fall grapes, has been found unsatisfactory by home canners. The acid in these tart fruits, according to the U. S. Department of Agriculture, may keep them from spoiling when sealed in jars filled with cold water without heating or processing, but the fruits keep little or nothing to make them appetizing.

Science News Letter, June 16, 1945

ASTRONOMY

Eclipse Visible to Fighters in Pacific

➤ A PARTIAL eclipse of the moon on Monday, June 25, will be visible to our fighters in the Pacific, although we in the United States will not be able to enjoy the spectacle.

The moon will partly enter the shadow of the earth for people in the Pacific, Indian and Antarctic Oceans, Asia, Australia and southeast Africa. Instead of light being cut off from the entire moon, only 86.4% of the moon at most will be eclipsed. The moon will enter the shadow proper, or umbra, at about 1:37 p.m., Greenwich Time, and will leave it at 4:51 p.m.

Science News Letter, June 16, 1945

AVIATION-MEDICINE

Mechanical Head Used To Test Oxygen Masks

➤ A MECHANICAL head that breathes and can smoke, a practical device for testing oxygen masks and heated coverings for use at the extreme low temperatures encountered by airplane crews at high altitudes, was displayed to a selected group of scientists in New York by the General Electric Company, in whose laboratories at Bridgeport, Conn., it was constructed. It has recently been placed in use by the Army Air Technical Service Command at Wright Field, Ohio, where the idea was developed and specifications prepared.

The mechanical head resembles the human head in size and shape. A rigid skull of wood maintains the contour of the face, while a layer of "flesh" made of synthetic rubber sponge simulates the resiliency of the human tissues so that the mask fits closely. Heating wires are laid on the sponge tissue, and over this is placed a synthetc rubber skin. When electrically heated it simulates the thermal properties of the human face. Breathing is simulated by electrically controlled artificial lungs.

When used in testing, the breathing head, equipped with an oxygen mask, is placed in a chamber with a temperature as low as 60 degrees below zero Fahrenheit, if desired, and is operated by remote control from an instrument board in a comfortable room. It replaces human beings formerly used, who often suffered discomfort and danger from the extreme cold. Also it permits testing under conditions much more severe than is possible with humans.

Science News Letter, June 16, 1945

HORTICULTURE

Vegetables Without Soil

Lettuce, cucumbers, green peppers, white radishes and tomatoes will constitute the regular crops of the hydroponic garden on rocky Ascension island.

By FRANK THONE

See Front Cover

AFTER the war, Uncle Sam is going to find himself in possession of a whole flock of desert islands. He doesn't especially want them, but after dispossessing the Japs at high cost in American boys' lives he won't feel like throwing them away again.

Some of them will be valuable as naval and air bases, and as cable and radio centers, so at least small garrisons and technical operating forces will have to be maintained on them. Feeding these men is likely to be expensive, for most of these islands are actually desert: they consist either of bone-white coral sand or equally sterile lava and volcanic ash, with little or no soil suitable for gardening. Practically all provisions will have to be shipped in.

One means for relieving the monotony of a shipped-in diet for the forces stationed on these islands is now receiving its first large-scale try-out on the other side of the world. On Ascension island, a barren bit of rock that roosts almost on the equator midway between South America and Africa, the Air Quartermaster of the Army Air Forces has had set up a hydroponic garden, shown in the photograph on the front cover of this SCIENCE NEWS LETTER, that has begun to supply tomatoes, lettuce and other fresh salad vegetables for the garrison and transient flying personnel.

Heroic Undertaking

Attempting to grow green stuff on Ascension would seem at first glance to be almost as heroic an undertaking as gardening on the moon. Indeed, the island looks like a bit of the moon's surface, as depicted by astronomer-artists: its 35 square miles are simply a series of dead volcanic cones and narrow, cinder-choked valleys. A general idea of what the island is like can be gathered from the background of the cover picture.

Except for one green patch on top of the highest peak, that sticks up into the cloud level, the island gets almost no rain. The natural vegetation consists of scattered clumps of cactus, sparse dried-out grasses, and a white-washing of lichens on the rocks. It is altogether a Dantesque landscape—a lost world almost without any life of its own.

Forbidding as it is, this isolated little world has been the scene of some of the most intense activity of the whole war. Bombers and transport planes whose warcargoes helped to save North Africa from Rommel stopped here to refuel; fighters en route to India and China still touch down here in great numbers. When the first crop was gathered permanent garrison and transient personnel together numbered about 2,000; the number of course is always fluctuating; there is also a small civilian population that takes care of the highly important cable station which the British have long maintained on Ascension.

Here as everywhere else, water is the key to life. Every drop of water that all the fighting forces here use for all purposes has to be distilled from the undrinkable brine of the ocean. Army Engineers have set up an oil-fueled distilling plant that is a marvel of efficiency under the circumstances; it produces about 30,000 gallons of good fresh water every 24 hours.

This distilled water is what has made it possible for the military Robinson Crusoes on this desert island to satisfy their natural craving for something green, to supplement what comes out of the shipped-in boxes and cans and bags.

From now on as long as needed, everybody on the island can have lettuce at least twice a week, with cucumbers and green peppers to make the salad more tasty. There will be hot-flavored white radishes once a week. Tomatoes start out on a twice-a-week basis also, but when the vines reach full bearing there should be tomatoes every day.

Five Regular Crops

These five vegetables will constitute the regular crops of the hydroponic garden. Under the limitations imposed by space and working force available, it is considered best not to attempt growing vegetables that require cooking.

The hydroponic system used on Ascension is the one in which the plants are rooted in beds of sterile gravel, which

LETTUCE FOR SALADS—Lettuce is harvested leaf by leaf, letting the stalks stand to start producing again. In this way four crops can be harvested from the same plants, before re-setting becomes necessary.

NOT PRIZES—Kendrick Blodgett, who runs the hydroponic garden, looks pleased over some of his cucumbers. These aren't prize specimens —just "run o' the crop."

are irrigated every two days with water containing the essential mineral fertilizer elements in solution. After the trough-like beds have been flooded with 7,000 or 8,000 gallons of water, as much as will drain off is permitted to flow into a sump, where it is held for re-use at the next irrigation. About 70 per cent of the water used is recovered in this way.

Each bed is a long, narrow trough sliced out of the lava soil, three feet wide and 400 feet in over-all length, but divided into four descending steps to make drainage better. The beds are made waterproof with asphaltic concrete, lined with a non-toxic asphalt paint. There are 25 of them altogether, with gravel walkways between for the convenience of the working force, giving a total crop-raising surface of 30,000 square feet.

Protected From Sun

The whole installation, covering a space as big as a large city square, is partially roofed with white cloth supported on wire, like a Connecticut tobacco field; the strips are arranged to give protection from the noon sun to part of the beds, but over some of them, especially the cucumbers, the covering is complete. There are also windbreak-fences around the sides, to check the drying sweep of the southeast trade winds that blow endlessly over the island.

Some interesting problems have been encountered in connection with this soilless garden on a desert island. Cucumbers and green peppers need bees for pollination, and there were no bees on Ascension. So a hive of them was brought, by plane, from Brazil, 1400-odd miles away.

Tomatoes are normally able to pollinate themselves, but for some reason the pollen they produced here was scanty and not very good. So each flower gets a squirt of a growth-promoting substance, or plant hormone, which induces the formation of seedless fruit. Ascension tomatoes, being partially pollinated, do have seeds, but very few of them.

Lettuce is harvested here leaf by leaf, so that the stalk may be left standing to produce a new crop. Each stalk will yield four pluckings of leaves before it needs to be pulled up and replaced with a new plant.

Civilian in Charge

The whole hydroponic project on Ascension has from the outset been in charge of a civilian employe of the Army, an Indiana horticulturist named Kendrick Blodgett, who had already scored considerable success in raising vegetables under tropical conditions. As his chief aid he has Lieut. John S. Fisher, who in civil life was an entomologist. He recruited a force of ten non-commissioned officers to help him, by having the entire Air Forces screened for young men who had attended agricultural colleges. These are the men who will aid him in carrying the soilless gardening method to other islands. Seven more enlisted men, who had been farm boys before the war, were added to the working force out of ground personnel on the island itself.

One of Mr. Blodgett's eleven disciples had already had experience in hydroponic gardening; he raised flowers by that method in his own greenhouse in Philadelphia. Sgt. William Brientnall is a graduate of Pennsylvania State College. He has been put in charge of the propagation house, where all plants except radishes are started; as his aide he has Sgt. William Buckley, a California Agricultural College graduate.

Already first moves have been made toward the spread of these soilless gardens to other desert islands that are key points in our transoceanic airways network. A small installation has been set up on Christmas island, just north of the equator and almost due south of Honolulu.

Johnson Island Next

Next on the list is Johnson island, another coral patch a long airplane hop to the southwest of the Hawaiian center. Mr. Blodgett says that area commanders are asking for his gardens faster than he can get them set up, even with the aid of his devoted eleven. It looks as if hydroponics has a promising future in making the desert blossom, if not like the rose, at least like cucumbers and tomatoes.

Science News Letter, June 16, 1945

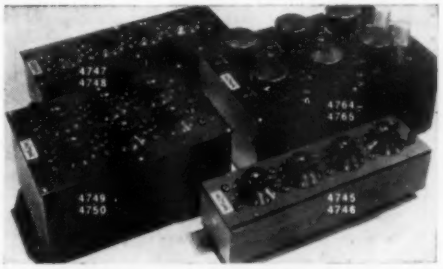
CHEMISTRY

Vitamin Discoverer Rescued From Nazis

➤ ONE of the men who discovered the chemical identity of vitamin C, Prof. Albert Szent-Gyorgyi of Budapest, was rescued from the Nazis and is now safe in Moscow. News of his safe arrival there comes from his colleague, Prof. Hugo Theorell in Stockholm.

The Swedish Legation in Budapest managed to save the Hungarian Nobel Prize Winner by employing him as chauffeur. A package of manuscripts covering his latest research has also been saved and is now being printed in Stockholm with funds from the Nobel Foundation. The manuscripts were smuggled from Budapest last November with Swedish help.

Science News Letter, June 16, 1945



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Do You Know?

The *sandbox,* tropical American tree, grows woody capsules which dry and burst with a loud report like a pistol shot, scattering their seeds.

Pollinating *insects,* such as honeybees and bumblebees, are not injured by sabadilla, a new insecticide for alfalfa, as they are by DDT.

Soil erosion by wind and water removes 20 times as much soil fertility annually as is required by agricultural crops.

The extraordinary *Brazil nut,* growing on trees from 100 to 120 feet high, is really a seed and not a true fruit like walnuts, or chestnuts.

Ocean currents are indirectly responsible for Peru's guano deposits; fish are stunned by the sudden change in temperature where a cold and a warm current meet off the coast, making the region a feeding area for guano-producing birds.

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PHYSICS

Microwaves Flow

Close relatives to wartime radar, they can be reflected from the human body as well as metal surfaces and can pass through tubes and around bends.

➤ MICROWAVES, close relatives to wartime radar, can be reflected from the human body as well as metal surfaces, and can be made to flow through pipes like water, reports Prof. George B. Hoadley, of the Polytechnic Institute of Brooklyn, and chairman of the New York Section of the Institute of Radio Engineers. The microwave band of the spectrum is sandwiched in between the frequencies suitable for radio broadcasting of sound and the heat and light frequencies. Transmitted from an antenna, one to two inches long, they exhibit strange properties.

The radar action of microwaves was demonstrated by Prof. Hoadley before the American Institute, by placing the transmitter and antenna equipment on the focal point of parabolic mirrors on the stage, then beaming the mirrors at a three-by-four-foot sheet of metal held aloft at the back of the auditorium. The transmitted waves directed by the parabolic reflector bounced off the metal surface and were picked up by the receiver, also in a parabolic reflector. He also showed that the waves could be reflected from a human body or even a hand, placed in the path of the beam.

Using a 24-foot tube of ordinary four-inch pipe, with an elbow joint in it, Prof. Hoadley showed that microwaves can pass with undiminished power through the tubes and around bends, like water.

He demonstrated that microwaves polarize, like light, by showing that when the receiving and transmitting antennae are set at right angles to each other, no signal is transmitted, even though they are in physical contact. However, when they are parallel, the radio signal can be transmitted.

"Just as glass makes light waves passing through it get shorter," Prof. Hoadley explained, "so does paraffin shorten the wavelength, although the frequency of the signal remains the same." Setting the transmitting antenna in a pipe four inches in diameter, and four feet long, the signal came through virtually with undiminished strength. Prof. Hoadley then fitted a one-foot section of tubing only one and a half inches in diameter to the end of the four-inch pipe. No trace of the signal came through the restricted section. The smaller diameter pipe acted like a perfect plug to stop the flow of current. Pushing a small solid rod of paraffin into the small pipe, the signal increased in volume reaching its full strength when the paraffin block completely filled the restricted pipe area.

Science News Letter, June 16, 1945

CHEMISTRY

Plastic Molding Compound From Surplus Sugar

➤ SURPLUS sugar (don't look now!) and waste products from sugar factories may be used to make a new plastic molding compound, it was revealed by Dr. Louis Long, of the Massachusetts Institute of Technology, in a report to the Sugar Research Foundation. The advantages of sucrose as a plastic raw material, he says, are due to its almost unlimited supply as an inexpensive, very pure organic compound.

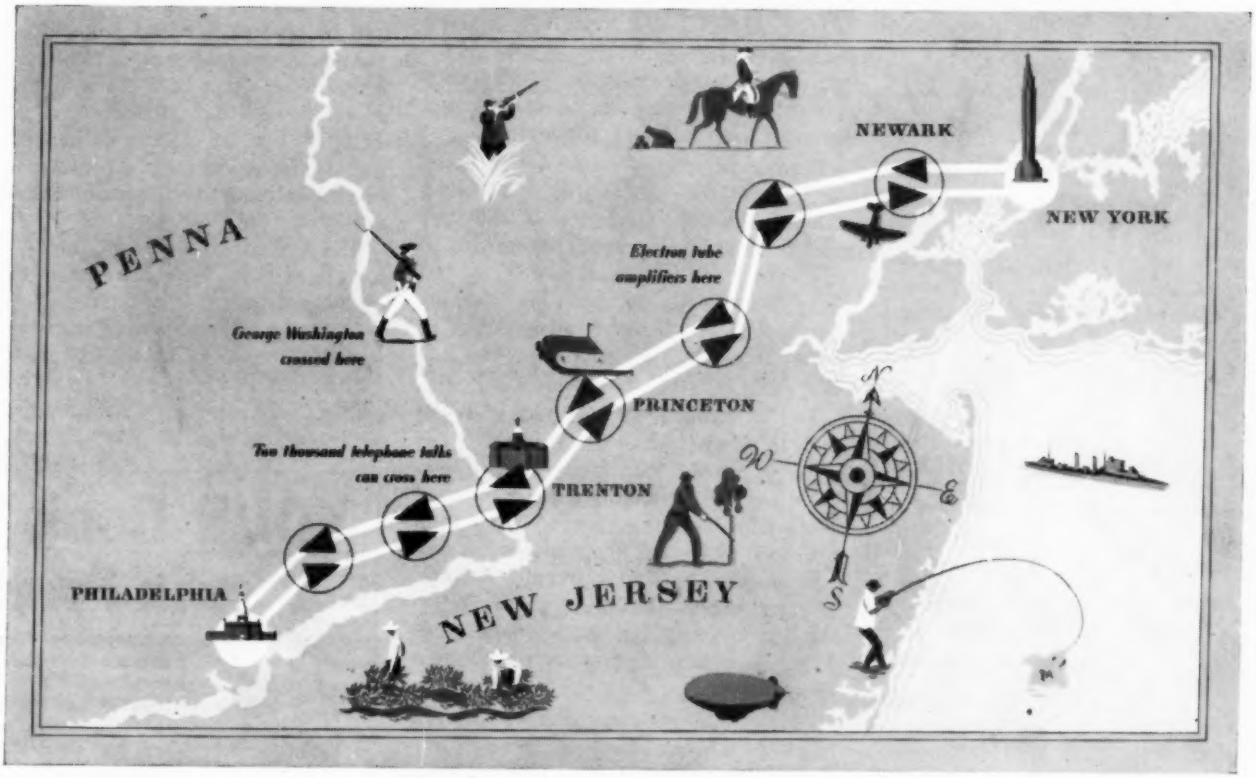
Many attempts have been made during the past 15 years to use sugar or its by-products as a raw material for plastic substances, he states. The results to date have been only theoretical because of the sensitivity of the sugar molecule to heat and chemical treatment, causing it to discolor, and because of the difficulty of controlling the polymerization to produce desirable results. A plastic molding compound, however, is already in commercial production on a small scale from bagasse, a waste product from sugar factories.

"Sucrose, and its hydrolysis products glucose and fructose, are potential raw materials," the report states, "for the formation of both colored and colorless plastics of either the phenolic or the alkyd type, the two resins produced in the largest quantity in this country. Sorbitol and mannitol, reduction products of glucose and fructose, should find application as polyhydric alcohols for alkyd resins. Bagasse molding powders are useful in the thermosetting phenolic plastic field."

Science News Letter, June 16, 1945

90-MILE LABORATORY

for Telephone and Television



BETWEEN telephone offices in New York and Philadelphia once stretched a strange sort of laboratory. Most of the way it was underground; engineers made their measurements sometimes in manholes. It was a lead-sheathed cable containing two "coaxials"— each of them a wire supported in the center of a flexible copper tube.

Theory had convinced engineers of Bell Telephone Laboratories that a coaxial could carry many more telephone talks than a full-sized voice frequency telephone cable; that it could carry adequately a television program. Experimental lengths were tested; terminal apparatus was designed and tried out. Finally, a full-sized trial was made with a system designed for 480 conversations. It was successful; in one demonstration people talked over a 3800-mile circuit looped back and forth. Now the cable is carrying some of the wartime flood of telephone calls between these two big cities.

This cable made television history also: through it in 1940 were brought spot news pictures of a political convention in Philadelphia to be broadcast from New York. Bell System contributions to television, which began with transmission from Washington to New York in 1927, have been laid aside for war work. When peace returns, a notable expansion of coaxial circuits is planned for both telephone and television in our Bell System work.

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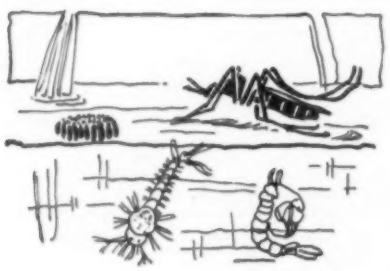
ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone



Victory Over Vectors

► UNINVITED and unwelcome camp-followers in all wars throughout history have been insects. Fleas and lice made themselves at home in all camps and castles, flies swarmed over the soldiers' food, mosquitoes and other winged blood-suckers pestered them on the march and bred by billions in moats and defensive ditches. Until very recently they were considered infernal nuisances, but bearable as compared with other campaign discomforts. The men scratched their bites, slapped at the flies, cursed routinely; but that was about all. (A knight in plate armor was well protected against mosquitoes; but it must have been tough when a flea or a cootie bit him and he couldn't get at the itchy spot.)

Late in the nineteenth century, however, after Pasteur had firmly established the germ theory of diseases, it began to be realized that many of the worst germs were carried about by these uninvited intimates of the camps. Typhus and plague, typhoid and dysentery, malaria and yellow fever—the list of indictments and convictions lengthened year by year. The foe might slay his thousands, but insects their tens of thousands.

During the first World War some efforts were made to conquer these insect disease carriers, or vectors as they are called in medico-entomological terminology. Some success was scored against flies, a little against lice, but nothing much against the other plague-bearers. One of the chief handicaps was the lack of a really effective insecticide.

DDT changed all that, so radically that it seems almost miraculous. Body vermin wilted before the medics' powder-guns like Japs before a flame-thrower. With them went the menace of typhus. Sprayed wholesale from planes in certain jungle-island experiments, it exterminated whole mosquito populations—though, regrettably, it also wiped out many harmless insects, such as butterflies.

However, the victory over vectors was not won with one weapon alone. Fumigation cabinets and bags, for example, have played a great part in delousing operations. Just keeping things well cleaned and screened has kept down the flies around established camps. The triple program of draining, oiling and poisoning has made swamps and ponds inhospitable to mosquitoes wherever time and means have been available to put it into practice.

One of our great air bases carved out of a jungle in the southern hemisphere, for example, has a fair-sized lake at one end of it. You would expect to encounter swarms of mosquitoes, with everybody compelled to wear head-nets and gloves. But there isn't a mosquito in sight. In their recreation time, the men play games bareheaded and with their sleeves rolled up, as if there were no such things as insects in the whole wide world.

Science News Letter, June 16, 1945

PHYSICS

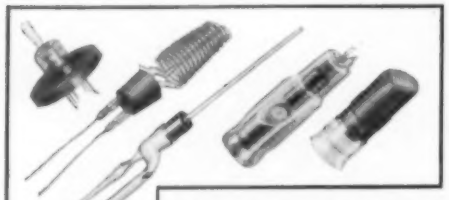
General Electric Plans $8,000,000 Laboratory

► WITH PLANS for expanded post-war research and development well under way, the General Electric Company has announced the pending erection of a new building to house its laboratories, at a cost of about $8,000,000. Construction will begin on a 219-acre estate near Schenectady as soon as WPB approval can be obtained. Dr. C. G. Suits, vice-president and director of research, revealed plans to expand the laboratory staff by several hundred workers.

A feature of the new building, to be built in the shape of a giant T, will be movable walls and partitions that can be set at 18-inch intervals so that rooms can quickly be made large or small as desired. Benches and all furnishings will be standardized.

The site of the new building is on a high elevation, thus permitting experiments with radar, high-frequency jet engines and other devices. The rocky cliff foundation will be useful in conducting experiments with X-rays, possibly permitting increases above 100 million volts.

Science News Letter, June 16, 1945



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• Books of the Week •

▶ WITH PENICILLIN available for general use and many other antibiotics coming to the fore, physicians and medical students especially will welcome a book dealing primarily with the clinical application of these new substances. Such a book is PENICILLIN AND OTHER ANTIBIOTIC AGENTS, by Wallace E. Herrell (*Saunders*, $5). Although stressing the clinical aspects, the author gives a brief review, with a few humorous anecdotes, of the history of penicillin and other antibiotics, their preparation and chemistry so far as known.

Science News Letter, June 16, 1945

▶ MANUFACTURING IN PLASTIC should be encouraged and simplified by the help of PLASTICS IN PRACTICE, by John Sasso and Michael A. Brown, Jr. It brings together a comprehensive list of plastic materials in general use, tells their characteristics and special properties, compares their usefulness for definite purposes both with each other and with older materials, and gives data on manufacturing methods and costs. (*McGraw*, $4.)

Science News Letter, June 16, 1945

▶ THE FUNDAMENTALS of radio are quite completely covered in INTRODUCTION TO PRACTICAL RADIO, by Durward J. Tucker, a manual for beginners which is also a valuable reference for practicing radio engineers and technicians. The principles involved in radio problems are explained with clarity. (*Macmillan*, $3.)

Science News Letter, June 16, 1945

▶ FARMERS and stock-raisers everywhere are showing increasing interest in what has been popularly nicknamed "test-tube breeding." Very timely, therefore, is the appearance of a very practical, compact book on the subject, THE ARTIFICIAL INSEMINATION OF FARM ANIMALS, (*Rutgers Univ. Press*, $3.50), written by a group of specialists under the general editorship of Enos J. Perry. Since it is thus far the only reasonably complete work on the subject, it is bound to have wide acceptance.

Science News Letter, June 16, 1945

▶ PICTURES AND DATA on all important planes of every air-minded nation are the heart of AIR NEWS YEARBOOK edited by Phillip Andrews (*Duell*, $4.75). Although you have seen some of the plane pictures elsewhere, the book gives you all the latest publishable facts of general interest about these planes. As a whole it is poignant evidence of the importance of air power in a world at war. Comparisons between Jap, Nazi and American aircraft pictures show that the Nipponese designers have drawn heavily upon foreign airplane ideas.

Science News Letter, June 16, 1945

▶ READING ABOUT ROCKETS in the words of one of the organizers of the American Rocket Society is interesting for specialists as well as for those interested generally in such wartime developments as the robot, bazooka, and the jet propelled plane in THE COMING AGE OF ROCKET POWER by G. Edward Pendray, (*Harper*, $3.50). The author traces the evolution of the rocket principle from its discovery centuries ago to the present day, then predicts what the future may bring from this little-used form of power. Easier to read than most of the recent books on this subject, this volume takes the reader into the confidence of the scientist and in understandable language unfolds a fascinating story.

Science News Letter, June 16, 1945

• Just Off the Press •

AGEING AND DEGENERATIVE DISEASES—Robert A. Moore, ed.—*Cattell*, illus., 242 p., $3. One of a series of volumes devoted to current symposia in the field of bioolgy.

BETTER LAWNS—Howard B. Sprague—*Doubleday*, 205 p., illus., $2.

BUILDING OR BUYING A HOUSE; A Guide to Wise Investment—Kenneth Johnstone and others—*McGraw*, 154 p., illus., $2.75.

THE CHEMICAL FORMULARY: A Collection of Valuable, Timely, Practical Commercial Formulae and Recipes for Making Thousands of Products in Many Fields of Industry. Vol. 7—H. Bennett—*Chemical Pub.*, 474 p., $6.

DYNAMIC METEOROLOGY—Jorgen Holmboe and others—*Wiley*, 378 p., illus., $4.50.

INDUSTRIAL PLASTICS—Herbert R. Simonds—*Pitman*, 396 p., illus., $5. Third ed.

MODERN BIRD STUDY—Ludlow Griscom—*Harvard Univ. Press*, 189 p., illus., $2.50.

PLANTS AND PLANT SCIENCE IN LATIN AMERICA—Frans Verdoorn, ed.—*Chronica Botanica*, 381 p., illus., $6.

THE SUPERFORTRESS IS BORN: The Story of the Boeing B-29—Thomas Collison—*Duell*, 218 p., illus., $3.

SYNTHETIC RUBBER FROM ALCOHOL: A Survey Based on the Russian Literature—Anselm Talalay and Michel Magat—*Interscience*, 298 p., illus., $5.

WINGS AND THE WEATHER; A Study Guide in Meteorology for Pilots—A. L. Chapman and others—*Pitman*, 188 p., paper, illus., $1.80.

WOMAN'S MEDICAL PROBLEMS—Maxine Davis—*McGraw*, 220 p., $2.

Science News Letter, June 16, 1945

To those who wonder why we need still bigger War Loans

IN THE 7th War Loan, you're being asked to lend 7 billion dollars—4 billion in E Bonds alone.

That's the biggest quota for individuals to date.

Maybe you've wondered why, when we've apparently got the Nazis pretty well cleaned up, Uncle Sam asks you to lend more money than ever before.

If you have, here are some of the answers:

This war isn't getting any cheaper

No matter what happens to Germany—or when—the cost of the war won't decrease this year.

We're building up a whole new air force of jet-propelled planes and bigger bombers.

We're now building—even with announced reductions—enough new ships to make a fair-sized navy.

At the time this is written, our casualties are nearing the million mark in dead, missing, and wounded. Wounded men are arriving in this country at the rate of over 30,000 a month. The cost of caring for these men is mounting daily.

No—this war isn't getting any cheaper. And won't for some time.

This year—2 instead of 3

We need as much War Bond money this year as we did last. But there will be only 2 War Loans this year—instead of the 3 we had in 1944.

Each of us, therefore, must lend as much in two chunks this year as we did last year in three. That's another reason why your quota in the 7th is bigger than before.

The 7th War Loan is a challenge to every American. The goal for individuals is the highest for any war loan to date. The same goes for the E Bond goal. Find your personal quota—and make it!

ALL OUT FOR THE MIGHTY 7th WAR LOAN

•New Machines and Gadgets•

⚙ *FINE WIRES are brazed by a new method that gives a smooth joint and saves materials. A mixture of equal parts of filed silver and borax flux are used. The end of one wire is moistened or heated and stuck in the mixture. The two wires are then brought together and fused over a gas flame.*

Science News Letter, June 16, 1945

⚙ *RESIN ADHESIVE, recently developed for bonding intricate wooden parts without the application of high pressure, is particularly valuable in furniture and musical instrument manufacture. This ureaformaldehyde resin is not subject to fine cracking as are many glues, and is moisture resistant.*

Science News Letter, June 16, 1945

⚙ *FLOATING repair shops for motorized Army equipment, now in use in the Pacific area, are concrete ships nearly 270 feet in length that are towed by Naval boats to the beaches where needed. They carry supplies of replacement parts and machinery for repair work.*

Science News Letter, June 16, 1945

⚙ *DEFROSTING frozen foods by electronic heating, using radio-frequency waves in a new kitchen unit, is a process taking minutes instead of hours as in the customary thawing method. The unit,*

shown in the picture, is a "dielectric oven" in which the interior of the frozen food is heated as rapidly as the surface.

Science News Letter, June 16, 1945

⚙ *SUCTION clothesbrush, electrically operated in a manner similar to vacuum cleaner, has its motor, fan and dust bag all within its combined back and handle. It is little larger than the ordinary clothesbrush with wooden back.*

Science News Letter, June 16, 1945

⚙ *PHOTOGRAPHIC lens has a built-in heating system to prevent shrinkage of its metal by low temperatures encountered at high altitude. Photographic shots taken with the four-foot lens at heights of eight miles can be enlarged into giant-sized maps that reveal details clearly.*

Science News Letter, June 16, 1945

⚙ *FOUR-WHEELED plow, with special attachments, buries rubber-insulated telephone wire in the ground in a single economical operation. Pulled by a truck, it opens a two-foot deep furrow and refills it, burying the wire delivered to the bottom of the trench by mechanism just behind the plow.*

Science News Letter, June 16, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 263.*

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